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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/148,723	09/03/98	FARNWORTH	MI22-981

QZ1567 QM12/0718
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EXAMINER
TUGBANG, D

ART UNIT	PAPER NUMBER
3729	

DATE MAILED: 07/18/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

7-18-01

Office Action Summary

Application No.

09/148,723

Applicant(s)

FARNWORTH ET AL.

Examiner

Dexter Tugbang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 6, 8, 11, 13, 20, 22, 23, 26, 27, 30, 31, 36, 37, 45 and 48-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 8, 11, 13, 20, 22, 23, 26, 27, 30, 31, 36, 37, 45 and 48-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____.

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DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/20/01 has been entered.

Election/Restrictions

2. The Restriction Requirement (in Paper No. 5) still stands as Applicants have not noted to change inventions. Pending Claims 1-3, 6, 8, 11, 13, 20, 22, 23, 26, 27, 30, 31, 36, 37, 45 and newly added Claims 48-50 are all believed to be readable on the elected invention of Species F, drawn to Figure 6. Applicants election of Species F is noted in Paper No. 6.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-3, 6, 8, 11, 13, 20, 22, 23, 26, 27, 30, 31, 36, 37, 45 and 48-50 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Each of Claims 1, 3, 13, 23, 27, 31 and 48 have ambiguous claim terminology which is unclear whether later recitations of originally recited terms are intended to refer to the originally recited terms. For example in Claim 1, the phrase of "a substrate" (line 5) is unclear if this is referring to the previous phrase of "a substrate" (line 1) in the preamble. How many substrate(s) are there? This ambiguity renders the claim as being vague and indefinite and the same problems occur in each of Claims 3, 13, 23, 27, 31 and 48. The Examiner suggests amending the 2nd occurrence in each of the claims of "a substrate" to recite as ~~the~~ substrate--, to avoid the 112, 2nd paragraph rejection.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

6. Claims 13 and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Lapastora 5,782,399.

Lapastora discloses the claimed bonding method comprising: providing a frame (contact loading plate 72) having a plurality of holes (openings 86) sized to receive individual balls of solder (contacts 32); delivering, placing, inserting or depositing the balls of solder from over the frame by dipping a substrate 20 into a volume of the volume of balls of solder (see sequence of Figures 7-9); placing the balls into registered alignment into each of the holes (shown in Fig. 9);

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and subsequently bonding the balls of solder to their respective bonding pads (contact solder 36, discussed at col. 7, lines 50+). The act of "dipping" is broadly read as tilting where the substrate is tilted, i.e. dipped, at a certain angle (in Fig. 8) and then returned to a horizontal level (in Fig. 9), all for the placement of the balls of solder relative to the substrate.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3, 6, 8, 11, 13, 20, 22, 23, 26, 27, 30, 31, 36, 37, 45 and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Trabucco 5,899,737, the Publication to Kasulke et al (Item AR in Applicants' IDS of Paper No. 3), and Lapastora.

Trabucco discloses the claimed bonding process comprising: retaining a plurality of balls of solder 24 over respective bond pads of a substrate 10 in the absence of flux (see col. 4, lines 25-27), using a frame (masking plate 18) having holes 22; exposing the balls of solder to laser bonding conditions effective to bond the balls of solder to the bond pads in which the position of the laser is fixed and the frame, with the substrate, moves so that each ball of solder can be bonded (shown in Figure1); and removing the frame after laser bonding. Trabucco's balls of solder are placed, delivered or inserted by a pickup head to accurately position the balls of solder in the holes of the frame relative to the bonding pads of the substrate. The claimed feature of a "laser" can be broadly read as the highly focused Xenon light 32 beam used to bond the balls

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solder to the substrate. Also, Trabucco teaches an alternative to using the Xenon light for bonding would be the use of a laser (see col. 4, lines 3+).

Regarding Claims 1, 3, 13, 23, 27, 31 and 48, Trabucco does not teach placing, inserting, or delivering balls of solder into holes of the frame by *dipping* the substrate into a volume of the balls of solder.

Lapastora teaches an aligning process in which a substrate 20 has a frame (contact loading plate 72) with holes (openings 86) and the substrate and the frame both are tilted or *dipped* (see Figures 7-9) to accurately position the balls of solder relative to the substrate for subsequent bonding. Lapastora teaches that an advantage of such an aligning process provides an easy-to-use and low cost method reducing the manufacturing time of bonding balls of solder (see col. 2, lines 42-54). Furthermore, Lapastora achieves the same art recognized results as Trabucco of placement of the balls of solder on the substrate with bonding pads to bond the balls of solder to the substrate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Trabucco by using the alignment process of Lapastora, to achieve the same art recognized results of accurately placing balls of solder onto a substrate with bonding pads and to also recognize the advantages of an easy-to-use, low cost method thereby reducing the overall manufacturing time.

If Applicants believe that the use of a *laser* to bond balls of solder is in anyway disadvantageous, then Kasulke et al solve the problems of bonding balls of solder onto a substrate with a laser (shown in Fig. 3) to elevate the temperature of the balls of solder to perform a reflow operation. Kasulke bonds the balls of solder in a flux free, i.e. absence of flux,

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process to provide an environmentally friendly bonding process as well as reducing the overall manufacturing time by not having to perform a second reflow step (see page 1 , Introduction). It is well worth noting that both Kasulke et al and Trabacco, each share the common concept of bonding in the absence of flux.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the Xenon light of Trabacco for the laser machine of Kasulke, to achieve the same art recognized equivalent of flux free bonding and to positively provide an environmentally friendly bonding process, reducing the overall manufacturing time.

Response to Arguments

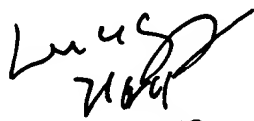
9. Applicant's arguments with respect to the merits of Trabacco have been considered to be fully met by the rejection set forth above.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

11. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Dexter Tugbang whose telephone number is 703-308-7599. The Examiner can normally be reached on Monday - Friday 7:00 am - 4:30 pm.

adt
July 13, 2001


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